

Claim 16 has been amended as follows:

15 — 16. (Amended) A method for fabricating a front-side repairable TFT-LCD assembly according to claim 10 further comprising the step of providing at least five spaced-apart and parallel repair lines laid out around a circuitry on said TFT-LCD, said at least five repair lines intersect said first multiplicity of buslines with an insulating layer thereinbetween.

Claim 19 has been canceled.

REMARKS

Thorough examination and careful review of the application by the Examiner is noted and appreciated.

Claim Rejections Under 35 USC §112

Claim 16 is rejected under 35 USC §112, second paragraph, for a typographical error in the claim. Claim 16 has been amended to correct the typographical error. A reconsideration for allowance of claim 16 is respectfully requested of the Examiner.

Claim Rejections Under 35 USC §103

Claims 1-22 are rejected under 35 USC §103(a) as being unpatentable over Kim et al '948, in view of Kim et al '341 and Fujikawa et al '178. It is contended that Kim '948 discloses a repairable matrix display including wirings such as gate lines, data lines and a first multiplicity of buslines. It is further contended that Kim '948 discloses a method of using repair lines to intersect the gate lines and the buslines with an insulating layer therein-between wherein the repair lines are formed around a display region. While the Examiner conceded that Kim '948 does not disclose coating a black matrix film on a glass and patterning the film with apertures corresponding to the repair lines such that the laser beam can pass through, the Examiner contended that Kim '341 discloses a TFT-LCD with redundant connection in which the black matrix is formed by appropriately patterning a light-shielding layer so that a laser beam can pass through the aperture to perform the repair for the buslines. It is further contended that Fujikawa also discloses using an energy beam to electrically connect a disconnected scanning line through a metal portion 29a. Gate signals are transmitted through this bypass and thereby jumpering the disconnection.

The rejection of claims 1-22 under 35 USC §103(a) based on Kim '948, Kim '341 and Fujikawa '178 is respectfully traversed.

Kim '948 discloses a matrix-type display capable of being repaired by pixel unit. While Kim '948 discloses the use of repair lines formed in the shape of a closed curve around a display region wherein the repair line crosses the gate lines and the data lines, and being overlapped with them through an insulating layer. As correctly pointed out by the Examiner, Kim '948 does not disclose the coating of a black matrix film on a glass cover plate and does not disclose the patterning of the black matrix film for apertures corresponding to the position of the repair lines such that laser beams can pass therethrough.

Kim '341, at col. 7, lines 3+, discloses redundancy connecting lines and the use of laser beams to cut scanning signal lines through an aperture of the LCD such that signals can pass through the redundancy connecting line. Kim '341 further teaches the use of a laser beam to repair a wiring fracture of a scanning signal line occurred at the crossing portion. The Applicants respectfully submit that, contrary to the present invention method, Kim '341 teaches the use of laser beams through an aperture of a

LCD device, not through openings formed in a black matrix film, for cutting a signal line or repairing a fractured line, but does not teach the welding of two lines together by the laser beam. Furthermore, Kim '341 does not teach the formation of openings that are directly over the cross point of different signal lines in a black matrix film for the purpose of future repairs.

Fujikawa '178 discloses the use of irradiation of energy beams to reconnect a disconnected scanning line electrically through a metal portion that is formed by the energy beam. Fujikawa does not disclose the formation of a black matrix film, or the formation of openings in the black matrix film that are directly over the cross point of two signal lines where repair may be needed. Furthermore, Fujikawa does not teach the connecting together of two signal lines by a laser beam that passes through the opening in the black matrix film.

The present invention, on the other hand, clearly recites the operating steps of:

"Claim 1. A front-side repairable TFT-LCD assembly comprising:

a TFT-LCD equipped with a first multiplicity of buslines,

at least one repair line positioned outside of and in parallel with a circuitry on said TFT-LCD, said at least one repair line intersects said first multiplicity of buslines with an insulating layer thereinbetween, and

a black matrix film coated on a glass substrate positioned juxtaposed to said repair lines and buslines, said black matrix film having **a second multiplicity of apertures** formed therethrough each **corresponding to a location where one of said at least one repair line intersects said first multiplicity of buslines** allowing a laser to pass therethrough for **welding a repair line to a busline.**"

The Applicants respectfully submit that none of the three references, Kim '948, Kim '341 and Fujikawa '178, teaches the formation of a black matrix film with apertures corresponding to locations where the repair line intersects a busline, and furthermore, none of the three references teaches a process of welding a repair line to a busline.

The Applicants further submit that while the Examiner attempts to combine the Kim '948 reference with Kim '341 and the Fujikawa '178 reference, the Applicants respectfully submit that there can be no motivation for such combination. The Applicants cannot find any suggestion in either reference as to the desirability of such modification. In re Brouwer, 37 USPQ 2d 1663 (Fed. Cir. 1996). Without such suggestions made in either of the references, the basis for the selection of the references and the purported modification must undoubtedly be hindsight drawn from Applicants' disclosure. In re Oetiker, 24 USPQ 2d 1443 (Fed. Cir. 1992). In the present case, Kim'948 does not contain any teaching or suggestion that his repair method would function better by coating a black matrix film and by patterning the matrix film with apertures corresponding to the positions of the repair lines. Moreover, even when the three references are combined, the

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Applicants respectfully submit that none of the three references teaches the formation of apertures in a black matrix film corresponding to a cross point between a repair line and a busline.

The rejection of claims 1-22 under 35 USC §103(a) based on Kim '948, Kim '341 and Fujikawa '178 is respectfully traversed. A reconsideration for allowance of these claims is respectfully requested of the Examiner.

Based on the foregoing, the Applicants respectfully submit that all of the pending claims, i.e. claims 1-5, 7-18 and 20-22, are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.


Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version With Markings To Show Changes Made".

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In the event that the present invention is not in a condition for allowance for any other reasons, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims

Claim 1 has been amended as follows:

1. (Amended) A front-side repairable TFT-LCD assembly comprising:

a TFT-LCD equipped with a first multiplicity of buslines, at least one repair line positioned outside of and in parallel with a circuitry on said TFT-LCD, said at least one repair line intersects said first multiplicity of buslines with an insulating layer thereinbetween, and

a black matrix film coated on a glass substrate positioned juxtaposed to said repair lines and buslines, said black matrix film having a second multiplicity of apertures formed therethrough each corresponding to a location where one of said at least one repair line intersects said first multiplicity of buslines allowing a laser to pass therethrough for welding a repair line to a busline.

Claim 6 has been canceled.

Claim 10 has been amended as follows:

10. (Amended) A method for fabricating a front-side repairable TFT-LCD assembly comprising the steps of:

providing a TFT-LCD equipped with a first multiplicity of buslines,

providing at least one repair line laid out around a circuitry on said TFT-LCD, said at least one repair line intersects said first multiplicity of buslines with an insulating layer thereinbetween,

coating a black matrix film on a glass cover plate in said TFT-LCD,

patterning said black matrix film and forming a second multiplicity of apertures therein each corresponds to a cross-over point where one of said at least one repair line intersects said first multiplicity of buslines, [and]

mounting said glass substrate having said black matrix film patterned with a second multiplicity of apertures therein on said TFT-LCD as a cover plate[.] , and

passing a laser beam through at least one of said second multiplicity of apertures in said black matrix layer to weld a repair line to a busline by fusing through said insulating layer.

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Claim 16 has been amended as follows:

16. (Amended) A method for fabricating a front-side repairable TFT-LCD assembly according to claim 10 further comprising the step of providing at least five spaced-apart and parallel repair lines laid out around a circuitry on said TFT-LCD, said at least [three] five repair lines intersect said first multiplicity of buslines with an insulating layer thereinbetween.

Claim 19 has been canceled.